Individual Capstone Assessment

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At a high-level, our senior design project is centered on the development of an AI-powered nutrition application. Whether it's helping users plan meals, manage pantry and cart contents, or automatically generate grocery orders, NutriFlow will be designed to intelligently empower people to make healthier choices and pursue their fitness goals. By combining concepts from software engineering, database systems, and user-centered design, we aim to create a tool that provides a level of convenience and customization not seen in other nutrition tools. From my individual academic perspective, this project represents the intersection of my interests in computer science, nutrition/fitness, and practical problem solving. I have been committed to fitness and nutrition in my personal life for a long time now, and this project gives me an opportunity to merge that passion with my technical experience. It also gives me the opportunity to create something from scratch that I can carry forward in my career as a valuable demonstration of my skills, and perhaps even as a standalone product.

My coursework at the University of Cincinnati has prepared me with the technical foundation needed for this project in several respects. Courses I took early in my academic career such as Data Structures (CS 2028C), Python Programming (CS 2023), and Intro to Computer Systems (CS 2011) developed my programming skills and instilled a desire to write efficient, well-structured code. Database Design and Development (CS 4092) exposed me to important concepts such as designing and optimizing data storage, which will no doubt be essential for tracking foods, meals, and user preferences. In Software Engineering (EECE 3093C), I learned approaches to large-scale project design that directly apply to building a reliable application. Finally, more advanced classes such as Design and Analysis of Algorithms (CS 4071) and AI Principles and Applications (CS 4033) further expanded my ability to reason about performance and incorporate AI/ML into my work. As a whole, these courses have provided me with the base knowledge needed to design a project that is scalable, efficient, and user-focused.

My co-op experiences built on the knowledge that I learned in the classroom by helping me to develop practical skills and shape how I approach software development. I worked four rotations as a cyber engineering intern at Cryptic Vector which helped me to gain practical experience in reverse engineering, vulnerability research, and software development. These experiences refined my attention to detail, and although my RE/VR skills won't be directly applicable to my work on this project, they represent important developments in my overall problem-solving ability. Working on several different teams within the organization also helped me enhance my non-technical skills such as communication, project documentation, and adaptability/flexibility. Throughout my rotations, I observed the quality of professional code across different environments and gained exposure to various professional practices such as agile

development, code/design reviews, and diverse testing methodologies. I aim to pull heavily from this experience over the course of this project to ensure the result is a professional-grade product.

The primary reason I am motivated to work on this project is, as I mentioned earlier, it represents the intersection of my personal passion for health and fitness with my professional skills in computer science. Meal planning to ensure sustainable, goal-oriented nutrition while balancing shopping and cooking with the rest of life's commitments is a challenge I have personally faced throughout my adult life. I have used various existing solutions and even created my own spreadsheets in an attempt to streamline the process, but I have never been completely satisfied with the tools at my disposal. This project provides an opportunity for me to create the solution that I (and hopefully other people) have been looking for. One that combines convenience and customization to help improve the meal planning experience. It is also motivating to know that I will be applying my knowledge to a domain that has a direct, positive impact on people's lives.

As a preliminary approach, I will focus on defining user requirements and data models to ensure we can design the rest of the system atop a stable foundation. I would like to employ a modular system architecture that will allow the application to be scalable, and include a robust testing suite to ensure our planned features operate as we expect. As for my broader expectations, I want to deliver an application that is sleek, responsive, intuitive, and of course one that properly implements all our planned features (meal planning, cart/pantry management, grocery order creation, etc.). Success for me will be measured not just by the technical functionality of the software, but also by how well it can be used by real people. Throughout the project, I will self-evaluate my contributions by setting milestones, maintaining documentation on both the project and my contributions, and regularly revisiting our design documents to confirm that the product stays aligned with our original goals. Ultimately, I will know I have done good work when the application both functions reliably and delivers meaningful value to users striving for healthier lifestyles.